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XIX. *Some Things concerning Electricity, by the Rev. J. T. Desaguliers, LL. D. F. R. S.*

ABOUT a Year or Two ago, in a Paper I gave in to the ROYAL SOCIETY *, I endeavoured to establish some general Principles concerning Electricity, from the Consideration of many Experiments, which have been tried by others, as well as some new Experiments by myself, an Account of which I then gave. Therefore I shall only now repeat my Distinction of all Bodies into Two Classes, in respect of Electricity, and make good the Definitions that I gave by some further Experiments; and though I do not pretend to know the Cause of Electricity in general, yet I hope from a few Laws of Electricity, deduced from known *Phænomena*, to solve most other *Phænomena*, (tho' seeming quite unaccountable) so far as to shew what Law of Electricity they depend upon; and to be able to foretel what will happen to most Bodies, before the Experiments are tried upon them in an Electrical Way.

1. Bodies Electric *per se* are such in whom a Virtue of attracting and repelling small Bodies at a Distance is inherent, though it is not always in Action, so as to produce that Effect. But by rubbing, patting with the Hand, hammering, warming, and sometimes only exposing to dry Air, such Bodies exert the Virtue above-mentioned; otherwise they are in a Non-electric State.

2. Non-electric Bodies are such in which no Electrical Virtue can be excited by any Action upon the

* See these *Transactions*, N^o 454.

Bodies themselves, such as rubbing, warming, &c. But an Electric *per se*, when excited, can communicate its Virtue to a Non electric, and that Virtue will be received by all the Parts of the Non-electric, (be the Body ever so long, or large) and be strongest, being, as it were, collected, at that End of the Non-electric, which is farthest from the Place where the Electricity is first received.

3. A Non-electric, having received Electricity, will communicate to another Body brought to touch it, or only brought pretty near, and that often with a snapping Noise, and a small Flash of Light, losing by that means all its own Electricity.

4. An Electric *per se* will become a Non-electric for a time, if it be made wet or moist, and become receptive of Electricity, which it will receive at one End, and carry to the other, where the Electricity will go off with a small Explosion, to impregnate any other Non-electric, which is brought near.

5. An Electric *per se*, in which Electricity has been excited, may become Non-electric by being exposed to moist Air, whose humid Vapours it attracts; and then, brought to the Fire, or into very dry Air, recover its Electricity when the Moisture is exhaled again.

6. An Electric *per se* may be made strongly electric in Part of its Length, whilst the other Part remains in a non-electric State.

7. A Body in a State of Electricity (whether a Non-electric having received Electricity, or an Electric *per se*, excited to Electricity) will attract all Non-electrics, and repel other Bodies that are in a State of Electricity, provided the Electricity be of the same kind.

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8. A non-electric Body will not retain the Electricity which it receives from an Electric *per se*, unless it be free from touching any other non-electric Body; but must be suspended or supported by Electrics *per se* touching only them and the Air.

9. An Electric *per se*, when it is not reduced to a non-electric State, will not receive Electricity from another Electric *per se*, whose Electricity is excited, so as to run along its whole Length; but will only receive it a little Way, being (as it were) saturated with it.

10. An Electric *per se* will not lose all its Electricity at once, but only the Electricity of such Parts of the Body as have communicated it to other Bodies, or near which Non-electrics have been brought.

11. When a Non-electric, which has received Electricity, communicates its Electricity to another, it loses all its Electricity at once; and the *Effluvia*, in coming out, strike the new Body brought near, as well as the Body first made electric.

12. Excited Electricity exerts itself in a Sphere round the Electric *per se*; or rather a Cylinder, if the Body be cylindric.

13. The Electricity which a Non-electric of great Length (for Example, a hempen String 800 or 900 Feet long) receives, runs from one End to the other in a Sphere of electrical *Effluvia*. But all the Supports of this String must be Electrics *per se*.

14. If this String be branched out into many Strings, the Electricity will run to all their Ends.

15. If the non-electric String, which is to receive and carry on the electric *Effluvia*, be not continuous, but has between its Ends some Electrics *per se*, the
Effluvia

Effluvia will stop at the first of them, unless the Interruption or Discontinuation of the Non-electric be short; because in that Case the Electricity jumps from the End of the first Non-electric to the Beginning of the next, especially if the Air be very dry, even though the Ends of the String should be about a Foot distant, and no Body but the Air between. Sometimes indeed the Distance must not be above an Inch or two.

There are Two Sorts of Electrics *per se*, known by what follows: A Body impregnated with Electricity from one Sort will repel all Bodies that have that Sort of Electricity, till they have lost their own Electricity by coming to some Non-electric. But an Electric *per se* of the other Sort, though excited, will attract all those Bodies, though in a State of Repulsion on account of the other Electricity; and so *vice versa*.

XX. *An Account of some Electrical Experiments made before the ROYAL SOCIETY, on Thursday the 22^d of January 1740-1. by the Same.*

IT being a Matter in Dispute, whether there is any Difference between the Electricity of Glass, and that of Gums and Resins, I made the following Experiments, in order to settle that Point:

I fastened a String of dry Cat-gut (which, when dry, is an Electric *per se*) from one Pillar to the other, at the End of the Table in the Meeting-Room of the